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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,612	10/17/2003	Jochen Beintner	FIS920020080US2	2444
28211	7590	02/24/2005	EXAMINER	
FREDERICK W. GIBB, III MCGINN & GIBB, PLLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			KENNEDY, JENNIFER M	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,612

Applicant(s)

BEINTNER ET AL.

Examiner

Jennifer M. Kennedy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-19 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25-28 and 30 is/are allowed.
- 6) ☒ Claim(s) 12-18, 21-24, 29 and 31 is/are rejected.
- 7) ☒ Claim(s) 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

In view of Applicants' amendment to the claims, the objections of claims 12, 14, and 18 are withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23, 24, and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Nowhere, in the specification can the examiner find the description that the first heating process to form the (first) conductive buried strap occurs when the doped trench top oxide layer is formed. The examiner notes that paragraph [0023] of the original specification discusses that the thermal process to form the sacrificial oxide layer, an undoped oxide, diffuses dopant from the polysilicon to form the buried strap outdiffusion.

Claim 31 is rejected for being dependent on claim 29.

Claim Rejections - 35 USC § 102

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 12, 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Mandelman et al. (U.S. Patent No. 6,555,862).

In re claim 12, Mandelman et al. ('862) discloses the method of forming a memory device, said method comprising:

patterning a trench in a substrate (102);

filling a lower portion of said trench with a capacitor conductor (110);

forming a first conductive buried strap (112) in said substrate adjacent a top portion of said capacitor conductor

forming a doped trench top oxide (120) in said trench above said capacitor conductor; and

after forming said first conductive buried strap and forming said doped trench top oxide, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive buried strap (see column 5, lines 9-26).

In re claim 16, Mandelman et al. ('862) discloses the method further comprising depositing an undoped trench top oxide layer (122) in said trench above said doped trench top oxide.

In re claim 17, Mandelman et al. ('862) discloses further comprising depositing a gate conductor (142) in said trench above said undoped trench top oxide layer, wherein said undoped trench top oxide layer insulates said gate conductor from said capacitor conductor.

In re claim 18, Mandelman et al. ('862) discloses a method of forming a memory device said method comprising:

- patterning a trench in a substrate (102);

- filling a lower portion of said trench with a capacitor conductor (110); and

- forming a conductive buried strap (112) in said substrate adjacent a top portion of said capacitor conductor;

- forming a trench top oxide (120, 122) in said trench above said capacitor conductor, wherein said forming of said trench top oxide includes forming a doped trench top oxide layer above said capacitor conductor, and forming an undoped trench top oxide layer above said doped trench top oxide layer; and

- after forming said first conductive buried strap and forming said doped trench top layer, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive strap(see column 5, lines 9-26).

Claims 12, 16-18 are rejected under 35 U.S.C. 102(a) and/or 102(e) as being anticipated by Mandelman et al. (U.S. Patent No. 6,455,886).

In re claim 12, Mandelman et al. ('886) discloses the method of forming a memory device, said method comprising:

patterning a trench in a substrate (see column 4, lines 49-56 and Figure 3);

filling a lower portion of said trench with a capacitor conductor (108);

forming a first conductive buried strap (110) in said substrate adjacent a top portion of said capacitor conductor;

forming a doped trench top oxide (112) in said trench above said capacitor conductor; and

after forming said first conductive buried strap and forming said doped trench top oxide, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive buried strap(see column 6, lines 5-20).

In re claim 16, Mandelman et al. ('886) discloses the method further comprising depositing an undoped trench top oxide layer (116) in said trench above said doped trench top oxide.

In re claim 17, Mandelman et al. ('886) discloses further comprising depositing a gate conductor (120) in said trench above said undoped trench top oxide layer, wherein said undoped trench top oxide layer insulates said gate conductor from said capacitor conductor.

In re claim 18, Mandelman et al. ('886) discloses a method of forming a memory device said method comprising:

patterning a trench in a substrate (see column 4, lines 49-56 and Figure 3);
filling a lower portion of said trench with a capacitor conductor (108);
forming a conductive buried strap (110) in said substrate adjacent a top portion of said capacitor conductor;
forming a trench top oxide (112, 116) in said trench above said capacitor conductor, wherein said forming of s said trench top oxide includes forming a doped trench top oxide layer above said capacitor conductor, and forming an undoped trench top oxide layer above said doped trench top oxide layer; and
after forming said first conductive buried strap and forming said doped trench top oxide layer, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive buried strap (see column 5, lines 60 through column 6, lines 21).

Claims 12-13, 16-18 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Divakaruni et al. (U.S. Patent No. 6,242,310).

In re claim 12, Divakaruni et al. discloses the method of forming a memory device, said method comprising:

patterning a trench in a substrate (24);
filling a lower portion of said trench with a capacitor conductor (20);
forming a first conductive buried strap (30) in said substrate adjacent a top portion of said capacitor conductor

forming a doped trench top oxide (40) in said trench above said capacitor conductor; and

after forming said first conductive buried strap and forming said doped trench top oxide, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive buried strap (see column 5, lines 35-40).

In re claim 13, Divakaruni et al. discloses the method wherein said process of depositing said doped trench top oxide comprises a HDP-CVD process (see column 3, lines 55-60 and column 6, lines 1-10).

In re claim 16, Divakaruni et al. discloses the method further comprising depositing an undoped trench top oxide layer (60) in said trench above said doped trench top oxide.

In re claim 17, Divakaruni et al. discloses further comprising depositing a gate conductor (72) in said trench above said undoped trench top oxide layer, wherein said undoped trench top oxide layer insulates said gate conductor from said capacitor conductor.

In re claim 18, Divakaruni et al. discloses a method of forming a memory device said method comprising:

patterning a trench in a substrate (24);

filling a lower portion of said trench with a capacitor conductor (20); and

forming a conductive buried strap (30) in said substrate adjacent a top portion of said capacitor conductor;

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forming a trench top oxide (40, 60, see column 3, line 50 through column 4 line 20) in said trench above said capacitor conductor, wherein said forming of said trench top oxide includes forming a doped trench top oxide layer above said capacitor conductor, and forming an undoped trench top oxide layer above said doped trench top oxide layer; and

after forming said first conductive buried strap and forming said doped trench top layer, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive strap (see column 5, lines 35-40).

In re claim 21, Divakaruni et al. discloses the method wherein said process of depositing said doped trench top oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process (see column 3, line 55 through column 4, line 10).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-15 and 21 -22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mandelman et al. (U.S. Patent No. 6,555,862) in view of M'Saad (U.S. Patent No. 6,013,584).

Mandelman ('862) et al. discloses the method as claimed and rejected above, but does not disclose the method wherein said process of depositing said doped trench top

oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process, wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000 W, and a phosphine gas delivery at gas flows below 5 sccm and wherein during said process of depositing said doped trench top oxide layer, a percentage by weight of dopants in said doped trench top oxide layer is less than 1%.

M'Saad discloses the method wherein said process of depositing said doped trench top oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process, wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000W (see column 11, lines 8-28), and a phosphine gas delivery at gas flows below 5 sccm (see column 10, lines 15-60). The examiner notes as M'Saad discloses the flow rate of phosphine to be 10% of the flowrate of the silane, which may be 30- 50 sccm, means that phosphine is disclosed to have a flow rate less than 5 sccm.

M'Saad also discloses the method of forming the PSG film with less than 1% by weight of dopant (see column 11, lines 40-45). The examiner notes that Applicants teach that by forming the doped layer with the above parameters of the rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000W, and a phosphine gas delivery at gas flows below 5 sccm forms a film with a dopant concentration less than 1%. Therefore, the examiner asserts that the method of M'Saad during said process of depositing said doped trench top oxide layer, a

percentage by weight of dopants in said doped trench top oxide layer will be less than 1%.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the doped oxide layer of Mandelman et al. ('862) by the method of M'Saad because as M'Saad teaches the method allows for a dielectric layer with low moisture content and good gap fill capability (see abstract, M'Saad)

Claims 13-15 and 21 -22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mandelman et al. (U.S. Patent No. 6,455,886) in view of M'Saad (U.S. Patent No. 6,013,584).

Mandelman ('886) et al. discloses the method as claimed and rejected above, but does not disclose the method wherein said process of depositing said doped trench top oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process, wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000 W, and a phosphine gas delivery at gas flows below 5 sccm and wherein during said process of depositing said doped trench top oxide layer, a percentage by weight of dopants in aid duped trench top oxide layer is less than 1%.

M'Saad discloses the method wherein said process of depositing said doped trench top oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process, wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75

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sccm, approximate bias plasma power between 300-1000W (see column 11, lines 8-28), and a phosphine gas delivery at gas flows below 5 sccm (see column 10, lines 15-60). The examiner notes as M'Saad discloses the flow rate of phosphine to be 10% of the flowrate of the silane, which may be 30- 50 sccm, means that phosphine is disclosed to have a flow rate less than 5 sccm.

M'Saad also discloses the method of forming the PSG film with less than 1% by weight of dopant (see column 11, lines 40-45). The examiner notes that Applicants teach that by forming the doped layer with the above parameters of the rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000W, and a phosphine gas delivery at gas flows below 5 sccm forms a film with a dopant concentration less than 1%. Therefore, the examiner asserts that the method of M'Saad during said process of depositing said doped trench top oxide layer, a percentage by weight of dopants in said doped trench top oxide layer will be less than 1%.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the doped oxide layer of Mandelman et al. ('886) by the method of M'Saad because as M'Saad teaches the method allows for a dielectric layer with low moisture content and good gap fill capability (see abstract, M'Saad)

Claims 14-15 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Divakaruni et al. (U.S. Patent No. 6,420,750) in view of M'Saad (U.S. Patent No. 6,013,584).

Divakaruni et al. discloses the method as claimed and rejected above, but does not disclose the method wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000 W, and a phosphine gas delivery at gas flows below 5 sccm and wherein during said process of depositing said doped trench top oxide layer, a percentage by weight of dopants in said doped trench top oxide layer is less than 1%.

M'Saad discloses the method wherein said process of depositing said doped trench top oxide comprises a high density plasma-chemical vapor deposition (HDP-CVD) process, wherein said process of depositing said doped trench top oxide comprises the following parameters: depositing rate of silane reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000W (see column 11, lines 8-28), and a phosphine gas delivery at gas flows below 5 sccm (see column 10, lines 15-60). The examiner notes as M'Saad discloses the flow rate of phosphine to be 10% of the flowrate of the silane, which may be 30- 50 sccm, means that phosphine is disclosed to have a flow rate less than 5 sccm.

M'Saad also discloses the method of forming the PSG film with less than 1% by weight of dopant (see column 11, lines 40-45). The examiner notes that Applicants teach that by forming the doped layer with the above parameters of the rate of silane

reactant gas flow 10-75 sccm, approximate bias plasma power between 300-1000W, and a phosphine gas delivery at gas flows below 5 sccm forms a film with a dopant concentration less than 1%. Therefore, the examiner asserts that the method of M'Saad during said process of depositing said doped trench top oxide layer, a percentage by weight of dopants in said doped trench top oxide layer will be less than 1%.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the doped oxide layer of Divakaruni et al. by the method of M'Saad because as M'Saad teaches the method allows for a dielectric layer with low moisture content and good gap fill capability (see abstract, M'Saad)

Allowable Subject Matter

Claims 25-28 and 30 are allowed.

Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 23, 24, 29, and 31 are only rejected under 35 U.S.C. 112, 1st paragraph.

The following is a statement of reasons for the indication of allowable subject matter: the prior art, either singly or in combination, fails to anticipate or render obvious, method of forming a doped material adjacent a top of said capacitor conductor, performing a first heating process to form a first conductive buried strap in said

substrate, forming a doped trench top oxide in said trench above said capacitor conductor and after forming said first conductive buried strap performing a second heating process to form a second conductive buried strap in said substrate adjacent and connected to said first conductive buried strap in combination with the other limitations of claim 25.

Further, the prior art, either singly or in combination, fails to anticipate or render obvious, method of forming a conductive buried strap in said substrate adjacent a top portion of said capacitor conductor forming a trench top oxide in said trench above said capacitor conductor, wherein said forming of said trench top oxide includes forming a doped trench top oxide layer above said capacitor conductor, and forming an undoped trench top oxide layer above said doped trench top oxide layer, after forming said first conductive buried strap and forming said doped trench top layer, heating said device to form a second conductive buried strap in said substrate adjacent and connected to said first conductive strap in combination with also depositing a conductive node strap in said trench adjacent said capacitor conductor in combination with all of the other limitations in claim 19.

Response to Arguments

Applicant's arguments filed December 8, 2004 have been fully considered but they are not persuasive.

Applicants argue that Mandelman ('886) teaches only an initial heating process to form the conductive strap and does not disclose the additional claimed heating process that is performed after the first conductive strap is formed and that forms the

second conductive strap. The examiner notes that the claim only requires that a buried strap be formed prior to the heating process. As can be seen by rejection above, the examiner relies on 110 as the buried strap. Thus, the heating process is performed after formation of the buried strap. The examiner notes that is convention to consider a doped polysilicon layer that connects to the substrate in a trench capacitor to be called a buried strap (see for instance Mandelman (U.S. Patent No. 6,555,862). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., multiple heating steps) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants argue that Mandelman ('862) teaches only an initial heating process to form the conductive strap and does not disclose the additional claimed heating process that is performed after the first conductive strap is formed and that forms the second conductive strap. The examiner notes that the claim only requires that a buried strap be formed prior to the heating process. As can be seen by rejection above, the examiner relies on 112 as the buried strap. Thus, the heating process is performed after formation of the buried strap. The examiner notes that is convention to consider a doped polysilicon layer that connects to the substrate in a trench capacitor to be called a buried strap (see for instance Mandelman (U.S. Patent No. 6,555,862). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., multiple heating

steps) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant's arguments with respect to Chang et al have been considered but are moot in view of the withdrawal of the rejection.

The examiner notes that a new reference Divakaruni et al. (U.S. Patent No. 6,242,310) from which Divakaruni et al. (U.S. Patent No. 6,420,750) claimed priority has been applied. The examiner notes that since the references are similar the arguments present with respect to Divakaruni et al. (U.S. Patent No. 6,420,750) will be addressed.

Applicants argue that Divakaruni et al. teaches only an initial heating process to form the conductive strap and does not disclose the additional claimed heating process that is performed after the first conductive strap is formed and that forms the second conductive strap. The examiner notes that the claim only requires that a buried strap be formed prior to the heating process. As can be seen by rejection above, the examiner relies on 30 as the buried strap. Thus, the heating process is performed after formation of the buried strap. The examiner notes that is convention to consider a doped polysilicon layer that connects to the substrate in a trench capacitor to be called a buried strap (see for instance Mandelman (U.S. Patent No. 6,555,862). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., multiple heating steps) are not recited in the rejected claim(s). Although the claims are interpreted in

light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants present arguments with respect to the various combinations of the above references with M'Saad stating that M'Saad does not cure the deficiencies of the primary reference. The examiner notes that all arguments presented with respect to the primary reference have been addressed above.


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk